

## IN THE CLAIMS

Claims 1-44 (cancelled)

Claim 45 (new): An optical assembly comprising a light source, at least one sample vessel and a detector, the at least one vessel being positioned in a light path or paths created between the source and the detector in manner to enable transmission of light through the vessel wherein the light source is adapted to provide a beam of substantially collimated light, the detector comprises a plurality of detector locations and the vessel comprises a wall and core of relative shape and dimensions adapted to contain a sample for detection and to define at least two spatially separated transmitted light paths, a first wall path which enters and exits the vessel walls only, spatially separated from a second core path which enters and exits the vessel walls and additionally the vessel core, wherein the spatially separated wall and core paths are coupled to individual detector locations on the detector, and the detector is an array detector.

Claim 46 (new): Optical assembly of Claim 45 wherein the assembly defines a central core path and two peripheral wall paths either side thereof or an annular wall path thereabout.

Claim 47 (new): Optical assembly of Claim 45 wherein core and wall path beams are spatially close, preferably adjacent, on the array detector, facilitating direct referencing as the ratio of the core beam to the wall beam.

Claim 48 (new): Optical assembly of Claim 45 wherein the light source comprises at least one wavelength of light that is absorbed by one or more absorbing species comprised in the sample for

detection, the absorbance of which is to be detected.

Claim 49 (new): Optical assembly of Claim 45 wherein light is of wavelength in the range 160 to 1200 nm, preferably 180 or 190 to 1200 nm, corresponding to UV, UV-vis to near infra red (NIR).

Claim 50 (new): Optical assembly of Claim 45 wherein the at least one sample vessel in the assembly of the invention comprises a cell or conduit which is open ended and open based and topped, intended for dynamic sample detection.

Claim 51 (new): Optical assembly of Claim 45 wherein the sample vessel is a single cell or one of a plurality of cells in an array; or is a single capillary or one of a plurality of capillaries in a microcapillary array or a microfabricated channel array.

Claim 52 (new): Optical assembly of Claim 45 characterised by i.d.(inner diameter) (vessel) in the range 3 micron to 20 mm, o.d.(outer diameter) (vessel) in the range 4 micron to 30mm, refractive index (vessel) in the range  $1.3 < 1.6$ , refractive index (sample) in the range 1.3 to in excess of 1.5, ratio  $d$ (outer wall to detector distance)/o.d. is 0.5 to 10 and  $d$  is in the range 20 micron to 300 mm.

Claim 53 (new): Optical assembly of Claim 45 wherein an array detector comprises a solid state sensing device, preferably a CCD, CID or a CMOS APS.

Claim 54 (new): Optical assembly of Claim 45 wherein an array detector comprises a CCD, CID or CMOS APS including a surface stud comprising a coating to absorb incident light and reemit at a different wavelength, to convert UV to visible light, to allow detection by the CCD, CID or CMOS APS wherein the coating is

applied directly to the stud or to a cover slip interleaved between the stud and vessel, facilitating recoating as needed, by replacing the cover slip without need to replace the stud.

Claim 55 (new): Optical assembly of Claim 45 which comprises means for real-time signal processing for optimum peak detection and parameterisation/characterisation, and means for automatic system management including closed-loop feedback control of the apparatus and systems.

Claim 56 (new): Optical assembly of Claim 55 in which closed-loop feedback control means includes means for stopping or slowing the flow following initial observation in the detection means to allow sample to reside in the detector window and give longer times for data acquisition and enhanced signal to noise or to enable fraction collection, or to direct a fraction to an analysis means.

Claim 57 (new): Optical assembly of Claim 45 which is a module for use with a column or capillary separating device as known in the art, wherein the vessel is a capillary or column comprising interfacing means at one end for inserting into the outlet of a column or capillary separating device or along the length thereof, the capillary or column optionally comprising interfacing means enabling insertion into the inlet of an analysing means at the other end; or is a clip-on device comprising means for locating about a section of a capillary or column separating device which is of suitable i.d, o.d. and refractive index as hereinbefore defined and is stripped of any surface coating to facilitate the operation of the method of the invention, whereby the stripped capillary or column provides the sample vessel of the assembly.

Claim 58 (new): Optical assembly as hereinbefore defined in Claim 45 for use in the pharmaceutical, biomedical and bioscience,

agrochemical, veterinary and materials fields, for detection, analysis, characterisation and quantification of samples contained in a vessel, and optionally further collecting separated components thereof.

Claim 59 (new): Apparatus for chemical reaction or synthesis and analysis or for sample separation or transport wherein the apparatus comprises the optical assembly of Claim 45 as hereinbefore defined in which the chemical reaction vessel itself is cylindrical and the reaction monitored in batch flow mode as a function of time, and feedback control used to halt reaction or in which the reaction vessel is tubular and used in continuous flow mode.

Claim 60 (new): Method for detection of light transmitted through at least one sample contained within the core of at least one sample vessel of an optical assembly as hereinbefore defined in Claim 45, comprising illuminating the vessel with a substantially collimated light source or sources and detecting transmitted light in an array detector, wherein transmitted light is spatially separated into at least two light paths, a wall path which has passed through the vessel walls only, spatially separated from a core path which has passed through the walls and core, wherein the spatially separated light beams are coupled to individual detection locations on the array detector.

Claim 61 (new): Method of Claim 60 wherein a sample includes one or a plurality of analytes which it is desired to detect in the course of a chemical reaction generating or consuming a species as analyte.

Claim 62 (new): Method of Claim 60 which additionally comprises selecting a sample for analysis, determining individual wavelengths

at which absorption by desired sample components is strongest, checking refractive index of the sample in order to select a suitable sample vessel which when containing the sample and when illuminated will generate spatially separated beams as hereinbefore defined or selecting a suitable combination of optical components and filters and a suitable vessel to detect an array separation to couple spatially separated beams to independent locations on the detector array.

Claim 63 (new): Method of Claim 60 in which sample is introduced into the at least one sample vessel by injection, loop injection, pipette, hydrostatic, or electrokinetic injection and is removed from the vessel by injection, electrospray or interface for discard or to a further vessel for storage or to a down stream identification means.

Claim 64 (new): Method of Claim 60 which comprises referencing the light detected by the detection means by means of exposure referencing wherein the ratio of the core beam intensity to the wall beam intensity gives a value for the sample intensity at each location with elimination of excess or flicker noise due to light source fluctuation.